

XERIC HARDPAN FOREST (BASIC ROCKY SUBTYPE)

Concept: Xeric Hardpan Forests are woodlands with open vegetation because of restricted rooting depth caused by dense or shrink-swell clay. The Basic Rocky Subtype covers the rare communities with Xeric Hardpan Forest composition on rocky ridge tops and steep slopes over mafic rocks. Soils between the rocks appear to have dense shrink-swell clay layers and to restrict water movement and root penetration. The composition is somewhat different from examples on basic hardpan flats.

Distinguishing Features: Xeric Hardpan Forests are distinguished from Dry Oak–Hickory Forest and Dry Basic Oak–Hickory Forest by having a canopy of more xerophytic composition, with *Quercus stellata* dominant or codominant. The Basic Rocky Subtype is distinguished from the other basic subtypes by its occurrence on steep slopes or ridge tops and the presence of abundant rocks. The species indicative of wetter conditions, such as *Quercus phellos*, which are usually present in small numbers in the hardpan subtypes, are absent. No frequent plants are known to be exclusive to the Basic Rocky Subtype, but *Carya carolinae-septentrionalis*, *Piptochaetium avenaceum*, *Acer leucoderme*, *Muscadinia rotundifolia*, and *Parthenocissus quinquefolia* are generally much more abundant than in the Basic Hardpan Subtype. This subtype may grade conceptually into some of the glade communities. It is distinguished from them by its deep clayey soils between any rocks and by absence of any characteristic rock outcrop flora.

Synonyms: *Quercus stellata* - *Carya carolinae-septentrionalis* / *Acer leucoderme* / *Piptochaetium avenaceum* - *Danthonia spicata* Woodland (CEGL003713).

Ecological Systems: Piedmont Hardpan Woodland and Forest (CES202.268).

Sites: The Basic Rocky Subtype occurs on narrow ridge top and upper-to-middle slopes on substrates of gabbro, meta-basalt, or potentially diabase. The sites may have abundant cover of boulders but most of the ground surface is soil.

Soils: Most examples are mapped as Enon (Ultic Hapludalf) or Wilkes (Typic Hapludalf), a few as Iredell (Vertic Hapludalf) or other series. The soils have a dense clay layer despite their frequent high rock cover and occurrence on steep slopes. The dense clay layer and the xeric vegetation suggest that rooting depth is restricted as it is in other Xeric Hardpan Forests.

Hydrology: Soils appear to be xeric due to limited water penetration, which may be exacerbated by their occurrence on slopes.

Vegetation: The vegetation in the least altered remaining examples is an open forest or woodland dominated by *Quercus stellata* and *Carya carolinae-septentrionalis*, sometimes with *Quercus marilandica* or *Fraxinus biltmoreana* codominant. *Pinus echinata*, *Pinus virginiana*, *Carya glabra*, or occasionally other species are abundant. The understory is generally open. Besides canopy species, frequent species include *Cercis canadensis*, *Ulmus alata*, *Acer leucoderme*, *Juniperus virginiana*, *Cornus florida*, and *Diospyros virginiana*. Less frequent are *Prunus umbellata*, *Vaccinium arboreum*, *Crataegus uniflora*, and *Ulmus alata*, and a variety of other species. Shrubs generally are sparse. *Rosa carolina*, *Rhus aromatica*, *Viburnum rufidulum*, *Viburnum prunifolium*, *Ceanothus americana*, and *Symphoricarpos orbiculatus* are characteristic.

Vines may have substantial ground cover, especially in rocky areas. *Muscadinia rotundifolia* is most often dominant, but *Toxicodendron radicans*, *Parthenocissus quinquefolia*, *Lonicera sempervirens*, *Smilax rotundifolia*, and *Smilax bona-nox* may also be extensive. The herb layer generally dense. *Piptochaetium avenaceum*, *Schizachyrium scoparium*, or *Danthonia spicata* dominate. At least fairly frequent herbs in CVS plot data and site descriptions include *Melica mutica*, *Scleria oligantha*, *Tragia urticifolia*, *Dichanthelium boscii*, *Dichanthelium laxiflorum*, *Symphyotrichum patens*, *Lespedeza procumbens*, and *Lespedeza virginica*. Less frequent but likely characteristic species include *Scutellaria integrifolia*, *Acalypha gracilescens*, *Dichanthelium annulum*, *Coreopsis major*, *Dichanthelium depauperatum*, *Lespedeza repens*, *Lespedeza violacea*, *Stylosanthes biflora*, *Ruellia caroliniana*, *Phlox nivalis*, *Symphyotrichum undulatum*, *Symphyotrichum orbiculatus*, *Clematis ochroleuca*, *Pycnanthemum tenuifolium*, *Allium canadense*, *Allium cernuum*, *Asclepias verticillata*, *Clitoria mariana*, *Centrosema virginiana*, *Cunila origanoides*, *Andropogon gerardii*, and *Andropogon gyrans*. With a more natural fire regime, the canopy would likely be more open, the understory much sparser, and the herb layer more diverse.

Range and Abundance: Ranked G2. North Carolina examples are almost all in the Carolina Slate Belt geologic region, concentrated in the area of Montgomery and Stanley counties. It is unclear if this subtype occurs in any other states.

Associations and Patterns: The Basic Rocky Subtype occurs as small patches. It usually is surrounded by Dry Basic Oak–Hickory Forest. Upland Depression Swamp Forest patches may be adjacent or nearby.

Variation: No variants are defined. The formerly recognized variants are now treated as subtypes.

Dynamics: Dynamics are similar to those of other Xeric Hardpan Forests, with fire having once maintained a more open canopy and a more diverse herb layer than at present due to greater fire effects rather than much more frequent fire. Fire effects appears to be somewhat less extreme than for other subtypes, perhaps due to topography and small patch sizes. The reason for the greater abundance of *Carya carolinae-septentrionalis* in this subtype is not clear but may be related to fire behavior or rock content.

Remaining examples of this subtype appear to be less altered than other subtypes. Most examples retain a dense grassy herb layer. This may be because the rockiness and steep topography contribute more to keeping woody cover low, or it may be because land use was less intense on the slopes and ridge tops where they occur. Nevertheless, canopies probably have become denser and herb diversity declined due to fire suppression.

Comments: No published literature is known pertaining to this subtype. It is well covered by CVS plots, given its rarity. This description is based both on CVS plot data and site observations.

Rare species:

Vascular plants: *Eupatorium saltuense*, *Parthenium auriculatum*, *Solidago radula*, and *Symphyotrichum concinnum*.

References: